

SECTION VII

MISCELLANEOUS STUDIES AND REPORTS

A number of miscellaneous studies have been conducted by the Research and Development Branch and other staff units over the years. In addition to those summarized on the following pages, several other reports deserve mention.

A series of reports entitled *Projected Motor Vehicle Registration and Drivers Licenses Outstanding* was first published (as Report #27) in April, 1968, then (as Report #31) in March, 1970, both by the Research Branch. This function was then transferred to the Management Systems Section and the report was updated in October, 1974 (as Report #48). Report #48 was revised in October, 1976, October 1978, and again in February, 1981.

A public opinion survey was conducted by the Research and Development Branch and a report published in May, 1975 (as Report #54, Research and Planning Section) entitled *How the Public Views DMV*.

TITLE: Migration to California

AUTHOR(S): Ronald S. Coppin &
G. van Oldenbeek

DATE: March 1963

REPORT NUMBER: 13

FUNDING SOURCE: Departmental Budget

NTIS NUMBER: None

PROJECT OBJECTIVE:

Through a survey, to describe the origin, county of California residence, age, and sex composition of 31,358 households registering out-of-state vehicles in California.

SUMMARY:

Of the migrants who settled in California, survey responses indicated that 92.2% came from other parts of the United States, 4.7% from foreign countries, and 3.1% failed to state their place of origin. They settled all over California. Five states accounted for over 30% of the migrants, and ten states for over 50%; the distance between California and the state of origin stood out as an important factor in migration. The average number of persons per household for the migrant population (3.19) is greater than for the California general population (3.05). The average number per household for the migrant population, though somewhat smaller, approximated the average household size of their state of origin. The migrant population was significantly younger than the California general population, and there was a significantly higher percentage of males.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

None; descriptive statistics only.

SUPPLEMENTARY INFORMATION

None available.

TITLE: Error Rate Study, Division of Drivers' Licenses

AUTHOR(S): Maureen Miller

DATE: August 1978

FUNDING SOURCE: Departmental Budget

REPORT NUMBER: Unnumbered

NTIS NUMBER: None

PROJECT OBJECTIVE:

To identify errors in information contained in the drivers' license file; to describe their nature, number and sources.

SUMMARY:

This study was conducted in response to recommendations from the Commission on California State Government Organization and Economy (Little Hoover Commission) that DMV determine the rate, source, and nature of errors on the drivers' license file. During the week of January 16-20, 1978, random samples of documents processed by the Driver License Issuance, Court Abstracts, and the Financial Responsibility (FR) Unit then in the Division of Drivers' Licenses were collected. Documents collected and analyzed were: driver license applications, court abstracts, and financial responsibility accident reports. Original documents were compared with the EDP printouts of completed transactions, and errors were identified and tallied. It was found that overall error rates (for all types of errors) were 10.27% in Issuance, 9.73% in Court Abstracts, and 42.83% in Financial Responsibility.

When strikeovers were not counted as errors, the overall error rate for FR Accident Reports was 24.24%. Also, by policy of the FR Unit, magnetic tape selective typewriter (MTST) operators were not required to enter the vehicle license number even when it appeared on the accident report (some operators entered the number; some did not). Absence or error of the vehicle license number were considered as important errors from the driver's perspective. If the vehicle license number appeared on the original application, an error was tallied if the number was either entered in error or not entered at all on the cards produced by the MTST operators.

Overall, the most common kinds of errors were errors in ZIP code (in Issuance) and errors in vehicle license number (in both Court Abstracts and Financial Responsibility). The most common critical errors were address (ZIP code excepted as not critical) in Issuance, vehicle license number in Court Abstracts, and "other address" in Financial Responsibility. In Issuance, 31.6% of total errors were considered critical; in Court Abstracts 94.3% of total errors were critical; and in Financial Responsibility 59.4% of total errors were placed in the critical category.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

Findings were reported to the Chief of the Division of Drivers' Licenses for appropriate action.

SUPPLEMENTARY INFORMATION:

None available.

TITLE: The California Driver Fact Book

AUTHOR(S): California Department of Motor
Vehicles

DATE: Revised April 1981

FUNDING SOURCE: Departmental Budget

REPORT NUMBER: 29

NTIS NUMBER: None

PROJECT OBJECTIVE:

To provide a quick reference for traffic safety personnel and related program administrators.

SUMMARY:

The booklet contains information in three general areas: (1) enumerative and descriptive data on the driving population, (2) basic driver record data, and (3) evaluation of various driver improvement programs. Extensive charts and tables are provided with synopses of relevant research projects. The Fact Book was updated as new and important facts became available, but has been discontinued.

The original book was published in January of 1969; it was revised June, 1970, March, 1974, July, 1976 and April, 1981.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

Not applicable.

SUPPLEMENTARY INFORMATION:

The book is now out of print and has largely been supplmented by: Gebers, 1990 (Report #127); Gebers, Romanowicz, and McKenzie, 1993 (Report #141); and Romanowicz and Gebers, 1990 (Report #126).

TITLE: A Study of Alternative Strategies for Assessing Fees on Commercially Registered Vehicles

AUTHOR(S): California Department of Motor Vehicles

DATE: July 1984

FUNDING SOURCE: Departmental Budget

REPORT NUMBER: Unnumbered

NTIS NUMBER: None

PROJECT OBJECTIVE:

This study was initiated by the Division of Registration and Investigative Services. The scope of the study was subsequently broadened to meet the requirements of Senate Concurrent Resolution (SCR) 11 of the 1983 legislative session. The final report for this study was submitted in July 1984.

The objectives of this study were to:

1. develop a schedule for assessing weight fees on commercially registered power vehicles (6,500 or more pounds unladen) and trailers, based on declared laden or gross weight (GVW) of individual power vehicles and trailers (this schedule would replace the current unladen weight fee table; registration and vehicle license fees would continue to be collected);
2. develop a fee-assessment system for commercially registered power vehicles (6,500 or more pounds unladen) and trailers, based on the declared combined gross weight (CGW) of power vehicles (CGW would be declared for only power units and would include the total weight of the power unit, all trailing vehicles, if any, and all loads) and charging only a standard fee on each trailer (the CGW fee assessed on power vehicles and the trailer fee would replace the registration, vehicle license, and unladen weight fees currently collected on power vehicles and trailers); and
3. estimate the total 1985 revenue loss under a CGW fee schedule that would allow fees remaining on deleted interstate power vehicles to be credited toward fees due on their power vehicle replacements, and produce an adjusted CGW fee schedule that would recoup this revenue loss.

SUMMARY:

Data from the Department's automated vehicle registration files, registration documents, and a survey of a random sample of approximately 8% of all commercially registered power vehicles (6,500 or more pounds unladen) and trailers were used to calculate a per-pound fee for each alternative fee schedule. These per-pound fees were used to construct fee schedules that would produce revenue equal to the fees that would be collected in 1985 under the current system. The GVW fee schedule would assess approximately \$11.41 per 1,000 pounds, and the CGW fee schedule would charge about \$19.91 per 1,000 pounds.

The maximum loss of revenue that would occur in 1985 under the CGW fee schedule and fee credit-allowance plan was calculated. This estimate was equal to the total 1985 CGW fees that would be collected on all power vehicles added to interstate fleets. This potential revenue loss was approximately \$5.25 million, about 2.4% of total revenue that would be collected in 1985. The per-pound CGW fee was then increased to recoup this potential revenue loss and a revised CGW fee schedule was produced.

The Department recommended the adoption of a CGW fee assessment system that would assess fees only on power vehicles and allow fee credit on replacement power vehicles. The Department further recommended, however, that the legislature delay adopting any new fee schedule until completion of the report requested by Assembly Concurrent Resolution (ACR) 109 (1984). That resolution requested the California Department of Transportation to determine the highway cost responsibilities of various vehicle groups and submit a report of its findings by April 1985.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

The proposed fee assessment system was not adopted.

SUPPLEMENTARY INFORMATION:

An interim report for this study was submitted in January 1984 ("A Study of Alternative Strategies for Assessing Fees on Commercially Registered Vehicles," California Department of Motor Vehicles, January 1984).

The ACR 109 report (Highway Cost Allocation Study Final Report, California Department of Transportation, July 1987) presented a comparison of the revenue contributions and cost responsibilities of the various classes of motor vehicles operating in California. The report concluded that some classes are paying more than their fair share of fees, and certain other classes are paying less than their fair share, based on a consideration of vehicle weight and annual mileage. The report presented alternative fee assessment methods for producing more equitable assessment of fees. None of these methods were implemented. California has since implemented a new unladen weight fee assessment table that proportionally increases the fees in all weight categories. A legislative-authorized study (ACR 12 - 1994) of a GVW based fee structure and trailer fees is currently in progress.

TITLE: California Driver Survey: The Habits and Opinions of Drivers on Selected Traffic Safety Related Issues

AUTHOR(S): Karen Frinke &
Michael Ratz

DATE: August 1984

REPORT NUMBER: 92

FUNDING SOURCE: Departmental Budget

NTIS NUMBER: PB86-107679

PROJECT OBJECTIVE:

To collect information on driving exposure, socioeconomic factors, and attitudes about driving for a random sample of motorists.

SUMMARY:

From a sample of 9,495 California drivers, 5,631 responded to a 10-item questionnaire dealing with driver opinion, exposure (mileage), seat-belt use, and socioeconomic indicators. Respondents indicated strong support for provisional licensing of young drivers and for proof of auto insurance before car licensure, but strong opposition to expansion of mail-in license renewal to include all drivers, regardless of prior driving record. Opinions differed somewhat by level of education and prior driving record. Tabulations are presented on respondents' driving exposure, frequency of seat-belt use, and such socioeconomic indicators as education level, year of vehicle driven most often, employment status, whether respondent usually drove a four-cylinder car, and whether respondent was a housewife. Some of the driving exposure and socioeconomic items were similar to questions on the 1975 California Driver Survey.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

None. Mileage is used as a variable in other Research and Development reports on driver-record correlates.

SUPPLEMENTARY INFORMATION:

None.

TITLE: A Confidence Interval Approach to the Development of Blood Alcohol Concentration Charts

AUTHOR(S): Gary W. Arstein-Kerslake

DATE: March 1986

FUNDING SOURCE: Departmental Budget

REPORT NUMBER: 103

NTIS NUMBER: PB86-191236

PROJECT OBJECTIVE:

To develop blood alcohol concentration charts based on confidence interval estimates.

SUMMARY:

This report points out that alcohol nomograms and charts based on population averages may induce substantial inaccuracies in the estimates of individuals' blood alcohol concentrations (BACs). Also, many such charts require a compensating equation to account for the metabolic elimination of alcohol over a period of time. Together, these two factors can potentially lead to unsafe under-estimates of BAC.

An approach was developed for estimating expected BAC, varying as a function of time and amount of alcohol consumed, which incorporated a one-tailed confidence interval based upon an experimentally-derived estimate of individual variation (standard deviation). An interactive FORTRAN program was written to generate a series of BAC charts. BAC estimates were computed using a version of the Widmark equation, modified to incorporate the confidence-interval computation. Insofar as they provide BAC estimates which are very unlikely to unsafely underestimate the actual BAC, the confidence-interval weight-specific BAC charts are superior to average-value BAC charts.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

At the time of writing, the California Department of Motor Vehicles has distributed approximately four million copies of a half-page leaflet containing wallet-sized BAC charts generated using this method for eight weight ranges from 90 to 230 lbs., in increments of 20 lbs. These charts are also being used by a variety of other California agencies and permission has been granted for their use in several other states.

In addition the confidence-interval BAC charts (DL 606) are distributed with vehicle registration renewal notices and included in the California Driver Handbook.

SUPPLEMENTARY INFORMATION:

Published in *Abstracts and Reviews in Alcohol and Driving*, March, 1986, and *Journal of Safety Research*, 17(3),129-133.

TITLE: Effective-Time Charts

AUTHOR(S): Jensen Kuan

DATE: March 1986

FUNDING SOURCE: Departmental Budget

REPORT NUMBER: Unnumbered

NTIS NUMBER: None

PROJECT OBJECTIVE:

To graphically present trends in effective-time management in each DMV field office, each field office grade level, and statewide, in order to assess effectiveness of departmental operations in serving the motoring public.

SUMMARY:

A total of 99 time charts were produced: 93 for field offices, 5 for grade levels, and one statewide. While irregular fluctuations existed in some of the individual offices, data for each grade as well as statewide showed reductions in effective time, indicating improvement in departmental operations for serving the motoring public.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

Subsequent development of effective-time charting was limited to the division and statewide levels for various time periods.

SUPPLEMENTARY INFORMATION:

A variety of other charts, such as report of deposit of fees (RDF), holdout, cancellation, suspense, and normal charts have been prepared for division management. RDF charts have been developed also for each field office.

TITLE: Survey of Customer's Time in DMV Field Offices

AUTHOR(S): Dan Kadell

DATE: March 1986

FUNDING SOURCE: Departmental Budget

REPORT NUMBER: Unnumbered

NTIS NUMBER: None

PROJECT OBJECTIVE:

To monitor customers' time as a part of improving services in DMV field offices.

SUMMARY:

In January and February 1986, a survey was conducted to determine how much time customers spent in field offices on an average visit, and how that time was apportioned among the different processes. The following summarizes the findings.

1. Customers visiting field offices spent an average of 25 minutes in the office. One half of these customers completed their visit in 18 minutes or less.
2. Customers with vehicle registration business arrived at a service window an average of about 18 minutes after entering the office. Customers with driver's license business arrived at a service window an average of about 14 minutes after office entry.
3. Comparing offices of different sizes, the large grade IV and V offices did not have an average processing time distinguishably different from that of the smaller grade II and III offices, but they did appear to have a longer average wait time and average total time in office.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

No specific recommendations are made in this report. It was part of a continuous process of quality improvement.

SUPPLEMENTARY INFORMATION:

None.

TITLE: Operational Efficiency of Field Offices with Extended Office Hours

AUTHOR(S): Jensen Kuan & Ray Peck

DATE: April 1986

FUNDING SOURCE: Departmental Budget

REPORT NUMBER: Unnumbered

NTIS NUMBER: None

PROJECT OBJECTIVE:

To evaluate the impact of extended office hours on DMV field office productivity and quality of work.

SUMMARY:

Under the extended-hours format, some transactions and functions are processed outside of normal office hours. A comparison of 15 Grade IV extended-hour offices with 31 standard Grade IV offices produced the following conclusions:

1. Using extended office hours significantly decreased transaction time.
2. In terms of error rate, cancellation rate, and report of deposit of fees (RDF) rate, extended-hours offices, as a group, performed as well or better than regular offices.
3. There was no evidence that extended office hours, as used in these pilot offices, had a detrimental impact on wait time.
4. Effective transaction time showed continuous improvement over time, and this change represented a real, rather than chance, shift in the phase II transaction process.

It was recommended that the extended-hours program be expanded.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

The recommended expansion of the program has not been implemented overall. At the time of writing, continuation of extended hours is determined based on the needs of individual offices.

SUPPLEMENTARY INFORMATION:

None.

TITLE: Quality Control Methodology Applied to Field Office Efficiency

AUTHOR(S): Mary Janke &
Gary Arstein-Kerslake

DATE: April 1986

REPORT NUMBER: Unnumbered

FUNDING SOURCE: Departmental Budget

NTIS NUMBER: None

PROJECT OBJECTIVE:

To describe quality control (QC) methodology and apply it to interoffice efficiency comparisons.

SUMMARY:

The dependent variable on the basis of which offices were compared was effective transaction time. It was found that differences in transaction mix influenced effective-time scores. A method (standardization) for removing the effects of such differences is illustrated in the paper. It was recommended that QC methods be implemented, at first on a limited basis, to compare offices in transaction times, error rates, RDF rates (report of deposit of fees), and other measures. Because the relationship between field office grade and effective time was nonlinear, with grade 3 offices showing the lowest average effective transaction time, it was suggested that separate QC charts be made for offices of differing grade.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

The department currently has a quality improvement program but has not implemented a centralized process of calculating and maintaining statistical quality control charts of office transaction times or other workload and product indices.

SUPPLEMENTARY INFORMATION:

None.

TITLE: Conceptual Plan for an Integrated Management Information System

AUTHOR(S): Gary Arstein-Kerslake &
Raymond Peck

DATE: July 1986

REPORT NUMBER: Unnumbered

FUNDING SOURCE: Departmental Budget

NTIS NUMBER: None

PROJECT OBJECTIVE:

(1) To demonstrate the utility of, and need for, an integrated management information system, (2) to implement a rudimentary system as a demonstration of the feasibility of developing a full-fledged management information system, and (3) to chart a course for the future development of a management information system.

SUMMARY:

This report was developed in three parts to fulfill the three project objectives. In March 1986, Part 1, a paper entitled "Analysis of Field Office Productivity and Efficiency," reported on extensive analyses conducted to predict staffing and resource allocation based on FO 56 Volume/Time Report workload indicators and Phase II Production Statistics. Part 2, a paper presented on March 10, 1986, provided an extensive discussion on the need for an integrated management information system (MIS), and proposed a design which integrated database functioning, analytical capabilities, and graphic presentation into a single system. Part 3, dated July 25, 1986, further developed specifications of a rudimentary MIS with capabilities for statistical analysis and graphical presentation.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

None. The proposed model was not implemented.

SUPPLEMENTARY INFORMATION:

None.

TITLE: Executive Management Information System

AUTHOR(S): Rick Williams,
Steve Krimetz, &
Ron O' Dell

DATE: July 1986

REPORT NUMBER: Unnumbered

FUNDING SOURCE: Departmental Budget

NTIS NUMBER: None

PROJECT OBJECTIVE:

The Executive Management Information System was an attempt to develop a departmental management information system (MIS) for DMV. Summarized production data was compiled and formatted to provide information for middle and upper management.

SUMMARY:

The purpose of the Executive MIS was to identify data sources and information considered critical to DMV's management. The Executive MIS tracked production information at the divisional and departmental levels which was considered paramount by the Director and Division Chiefs.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

Responsibility for the Executive MIS has been transferred to the Division of Administration, Fiscal Services Branch, Forecasting/MIS Unit. Reports still are produced monthly.

SUPPLEMENTARY INFORMATION:

None.

TITLE: A Queueing Model of Customer Waiting Time in DMV Field Offices

AUTHOR(S): Anthony DeMaio

DATE: April 1987

FUNDING SOURCE: Departmental Budget

REPORT NUMBER: Unnumbered

NTIS NUMBER: None

PROJECT OBJECTIVE:

To develop a computerized queueing model for use in DMV field offices for possible reduction of customer waiting time.

SUMMARY:

A computer program based on classical queueing theory was developed to simulate the behavior of the physical field office situation, in terms of customer arrival time, window service time, average length of customer waiting lines, and other useful estimates.

Two field offices were chosen as experimental units. Instructions were developed and implemented, and data were collected. The results of the tests were not encouraging, since:

1. Waiting line behavior was non-linear and increased dramatically as the percentage of utilization went up.
2. The model hinged upon assumptions that were not met in the real-life field office situation, and the degree of similarity between the model and the physical situation was not known.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

None.

SUPPLEMENTARY INFORMATION:

None.

TITLE: Terminal Digit Workload Scheduling Project

AUTHOR(S): Anthony DeMaio

DATE: November 1987

FUNDING SOURCE: Departmental Budget

REPORT NUMBER: Unnumbered

NTIS NUMBER: None

PROJECT OBJECTIVE:

To develop a computerized workload scheduling system for the terminal digit (TD) operators.

SUMMARY:

In the process of developing quality improvement strategies for the TD operations unit, it was suggested that Research develop a computer model for workload scheduling. A FORTRAN program with complete documentation was developed and tested. The program was written using the "product mix" linear programming model to maximize work output. After being successfully tested, the computer program was transmitted to the Division of Headquarters Operations for possible implementation.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

Headquarters Operations decided not to implement the model.

SUPPLEMENTARY INFORMATION:

None.

TITLE: Standardization of Production Rates for Comparing Field Offices

AUTHOR(S): Dan Kadell

DATE: April 1988

FUNDING SOURCE: Departmental Budget

REPORT NUMBER: Unnumbered

NTIS NUMBER: None

PROJECT OBJECTIVE:

To develop practical examples of standardization techniques for use in DMV field offices and headquarters units.

SUMMARY:

The paper develops practical examples of standardization techniques for use in DMV field offices and headquarters units as part of the quality improvement methodology. After showing a hypothetical example, practical applications are presented using field office production data.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

None.

SUPPLEMENTARY INFORMATION:

The paper was published as *Quality Toolbox*, 13. April 1988

TITLE: Determining Sample Size

AUTHOR(S): Mary K. Janke

DATE: June-August 1988

FUNDING SOURCE: Departmental Budget

REPORT NUMBER: Unnumbered

NTIS NUMBER: None

PROJECT OBJECTIVE:

This paper was meant to introduce people unfamiliar with sampling theory and practice to some basic information needed in order to make a valid inference from a sample to a population.

SUMMARY:

The paper addresses at an elementary level the following questions: Why sample? What is a random sample? What is wrong with having a small sample? What information is needed to calculate sample size? Specific steps are given for calculating sample size in estimating a proportion or a mean. Some graphical approximations are included.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

The paper was reworked by Nik Dolmatoff into Volume 15 of the Quality Toolbox (July/August 1988), a publication of Quality Improvement and Planning (QIP), an office then existing within DMV. Dolmatoff's article contained more arithmetic detail and was written in an information-mapping format. This article, and the paper on which it was based, were subsequently used as guides to calculating sample size in projects undertaken by QIP.

SUPPLEMENTARY INFORMATION:

None.

TITLE: Prediction of Field Office Telephone Staffing Levels

AUTHOR(S): Anthony DeMaio

DATE: August 1988

FUNDING SOURCE: Departmental Budget

REPORT NUMBER: Unnumbered

NTIS NUMBER: None

PROJECT OBJECTIVE:

To develop a regression model for staffing telephone operations in DMV field offices.

SUMMARY:

This report was prepared in response to a request from Division of Field Operations. The question was, "Given several variables, is there a way to estimate the value of one variable from the other variables?" Data were collected from 46 DMV field offices on the number of phone calls received, staff time used, wait-time before answering the phone, percentage of time all lines were busy, percentage of phone calls that were unanswered, and number of calls per staff member. A four-variable model to predict staffing levels was developed.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

The Field Operations Division decided not to utilize the prediction model and associated computer algorithms. The department has developed and implemented a call-distribution management information system based on automated call-distribution technology.

SUPPLEMENTARY INFORMATION:

An interactive computer program for implementing the multiple regression prediction models on IBM PCs is available in the Research and Development Branch.

TITLE: Summary of Proceedings of the Conference on Driver Competency Assessment,
October 24-26, 1990, San Diego, California

AUTHOR(S): California Department of Motor
Vehicles

DATE: October 1990

REPORT NUMBER: 132

FUNDING SOURCE: Departmental Budget

NTIS NUMBER: None

PROJECT OBJECTIVE:

To present presentations given at this conference, which represents the second phase in a long-range effort to enhance the competency of the California driving public.

SUMMARY:

This 2-1/2 day conference consisted of a series of presentations by researchers and leading experts on driver competency and on the relationship between driver performance and age, followed by four workshops or concurrent sessions:

Concurrent Session A:	Standard Licensing Test Components for Novice
Concurrent Session B:	Aging and Medical Factors
Concurrent Session C:	Specialized Testing
Concurrent Session D:	Mobility and Risk Management

Presentations of the various speakers are summarized in these Proceedings.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

This material, in combination with other data, provided the basis for developing an improved licensure testing system in California. The department has initiated some of the components of a model program through a series of Research and Development Projects.

SUPPLEMENTARY INFORMATION:

See DMV Reports: Hagge and Romanowicz, 1995 (Report #148); Romanowicz and Hagge, 1995 (Report #154); and Hennessy, 1995 (Report #154). Also National Public Services Research Institute's final report, *Development of a Competency Based Driver License Testing System*, June 1990 (McKnight & Stewart).

TITLE: Driving Simulator Review

AUTHOR(S): Leonard A. Marowitz

DATE: January 1991

FUNDING SOURCE: Departmental Budget

REPORT NUMBER: Unnumbered

NTIS NUMBER: None

PROJECT OBJECTIVE:

To review and evaluate the technology, costs, and unresolved issues of contention related to driving simulators; to reach conclusions, based on research studies, about the validity of using driving simulators.

SUMMARY:

This paper points out that mechanical and electronic tests that place individuals in simulated driving environments have been used for almost 80 years to evaluate driver skill and competency, although little research has been done comparing performance in driving simulators to performance on the road.

The review describes two basic categories of simulators, interactive (driver has control of vehicle speed and/or direction) and noninteractive (driver has no control of vehicle). It notes that all driving simulators must offer a reasonably accurate visual presentation, have very fast (at least 30 Hz) updating of visual scenes, and have been validated. Noninteractive simulators are described as being typically used for driver training classes, being film- or video-based, and having computerized data-gathering ability, with a cost of about \$40,000 for a system with a control console, five cars and 13 different films. The discussion of interactive simulators notes that they are computer-based and involve closed-loop, real-time interaction between driver and driving scene. Interactive simulators vary widely in visual fidelity, motion of the platform, audio input, and other characteristics, and their costs range from \$10,000 (low fidelity, practical testing) to \$30 million (very high fidelity, experimental studies).

The paper stresses that driver competencies must be operationalized into measurable performance criteria whose assessment should determine the characteristics of driving simulators. It calls for more research on the predictive validity of driving simulators, both in general and in accordance with varying levels of fidelity and complexity. It is concluded that driving simulators can be useful in several ways to a licensing agency. They can be used to perform initial screening and determine who needs further road testing. Simulators can also be used to assess those driver competencies that cannot be readily assessed on a drive test, such as abilities related to night driving, emergency situations, and complex highway traffic situations.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

The department has acquired an interactive driving simulator and is currently conducting a feasibility study.

SUPPLEMENTARY INFORMATION:

None.

TITLE: Accidents, Mileage, and the Exaggeration of Risk

AUTHOR(S): Mary K. Janke

DATE: 1991

FUNDING SOURCE: Departmental Budget

REPORT NUMBER: Unnumbered

NTIS NUMBER: None

PROJECT OBJECTIVE:

To correct a common misinterpretation of the accidents-per-mile measure. The assumption that accidents should be proportional to miles driven is shown to be invalid and to exaggerate the accident risk of low-mileage groups.

SUMMARY:

This paper argues that the usual interpretation of accidents per mile as a measure of risk exaggerates the apparent risk of low-mileage groups--for example, teenagers and the elderly. The assumption of a linear proportional relationship between mileage and accidents is shown not to fit obtained data. Neither, the paper states, would it be expected to fit hypothetical data derived from a "standard driver" or a group of equally competent drivers driving different numbers of miles. People driving low mileages tend to accumulate much of their mileage on congested city streets with two-way traffic and no restriction of access, while high-mileage drivers typically accumulate most of those miles on freeways or other divided multilane highways with limited access. Because the driving task is simpler, the accident rate per mile is much lower on freeways and, beyond a certain point, a person driving half as many miles as another would be expected to have considerably more than half as many accidents. This and other considerations led to the author's suggestion that an induced exposure approach would be a more valid method of correcting accident rates for mileage.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

Not applicable.

SUPPLEMENTARY INFORMATION:

This paper was not published as a DMV report. The journal reference is Janke, M. K., Accidents, mileage, and the exaggeration of risk. *Accident Analysis & Prevention*, 23(2, 3), 183-188, 1991.

TITLE: Nomograms for Power, Sample Size and Effect Size for Statistical Tests

AUTHOR(S): Leonard A. Marowitz

DATE: April 1991

FUNDING SOURCE: Departmental Budget

REPORT NUMBER: Unnumbered

NTIS NUMBER: None

PROJECT OBJECTIVE:

To develop a reference which can be used to quickly determine the statistical power of a variety of widely used statistical tests.

SUMMARY:

This reference contains 124 nomograms or charts which can be used to determine the statistical power of:

1. The t test for mean differences.
2. The significance test for a Pearson product-moment correlation.
3. The test that a proportion is 0.50.
4. The test for differences between proportions.
5. The Chi-Square tests for goodness of fit and contingency tables.
6. The F test for fixed effect ANOVA and ANCOVA.
7. Multiple regression and correlation analyses.

An explanatory material it is stated that for each statistical test, the alpha level, number of observations per group (n), and measure of the standardized effect size must be known or estimated. Standardized effect size is defined, in general, as the difference between group means divided by either the standard deviation or variance, although this definition varies somewhat for each specific statistical test. The author reminds readers that the power of a statistical test is a measure of the ability of the test, under specific conditions of alpha, n , and effect size, to reject the null hypothesis when it should be rejected. In other words, it is the ability of a statistical test to evaluate results as significant when they are significant.

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

The nomograms are used as a reference to determine power for planned studies.

SUPPLEMENTARY INFORMATION:

None.

TITLE: Research Notes (Newsletter)

AUTHOR(S): California Department of Motor
Vehicles, Research and
Development Branch

DATE: Spring 1972- 1998

REPORT NUMBER: Unnumbered

FUNDING SOURCE: Departmental Budget

NTIS NUMBER: None

PROJECT OBJECTIVE:

To communicate the activities and research findings of the Research and Development Branch and others to management and operational personnel.

SUMMARY:

As of July 2004, nineteen issues of the newsletter had been published; publication is on an irregular basis. While most of the articles have dealt with research performed within the branch, some articles have presented overviews of outside research, and occasional articles have been written by other DMV staff, authorities in traffic safety, medicine, and related fields or, with permission, reproduced from other publications. Most articles are written by staff of the Research and Development Branch, and most deal with traffic safety-related issues, although management science is also represented. While the original expectation was that the newsletter would be solely an intradepartmental information source, the mailing list has now been expanded to include researchers and others in the traffic safety field nationwide.

Listed below are the dates of publication and list of articles.

Spring 1972

Introduction to Research Notes
Group Education Meeting (GEM)

March 1973

National Driver Improvement Seminar
Traffic Safety Education Task Force
GEM Progress
GEM Workload Reduction

Spring 1986

The Role of Research and Evaluation in a Driver's Licensing Agency
California's Tougher Drunk Driving Laws: Are They Working?
How Klutzes are Killing Us--and Themselves--with Clumsiness
From the Outside World
Do Repeat Traffic Violators Represent Increased Accident Risks?
The California Driver Record Study Series
Study of NOTS Shows Promising Results

Spring 1987

Obituaries--The Motorcycle Operator Skill Test (MOST)

Provisional Licensing
Management Survey of Field Offices
Implied Consent in California
Seat Belt Legislation: Getting It together

Fall 1987

Study Leads to Changes in NOTS Program
Tired Drivers, Unsafe Truckers: A Commentary
R.I.P.: Afterthoughts on an Obituary
California Tougher Drunk Driving Laws
Queue Who? -- Gesundheit
Targeting the High Risk Driver

Spring 1988

Accident-Reducing Value of NOTS Program Substantiated in Latest Report
Effects of TVS Dismissals on Accident Risk Assessment and License Control Actions
Should Visually Impaired Truck Drivers be Allowed to Share the Road?
DMV Hosts High-Risk Driver Conference

Fall 1989

Provisional Licensing for Teenagers
Mature Driver Graduates: What the Record Shows
NOTS Still Works
Renewal by Mail--Where Are We Now?

Winter 1989

Conference Presentations:

An Evaluation of Minnesota DWI Policy Changes, with Special Emphasis on the
"Administrative Per Se" Provision
Evaluation of the 1982 Wisconsin Drinking and Driving Law
Drivers with Multiple Licenses

Summer 1990

Development of a California DUI Management Information System
Assessing the Risk of Medically Impaired Drivers
Research Chief Interviewed for Inside Edition
Medically Impaired Drivers Known to DMV: Their Accident Risk

Fall 1990

A Better Way
Mature Driver Improvement Program, 1990
Epilepsy and Driver Risk
The General Deterrent Effects of California's 1982 DUI Legislative Reforms

Summer 1991

Age-Mediated Systems?
Developing Lapse Guidelines
If Youth Knew; If Age Could

Noticing

Summer 1992

Impact of California's .08% BAC Law

NOTS Program Saves Lives

Uninsured Motorists: Their Rate and Cost to Insured Motorists in California

Can DMV Keep Problem Drivers Off the Road?

New DMV Study Confirms Detrimental Impact of TVS Program

Winter 1993/94

Legislative Report on DUI Offenders

NOTS Program Saves Lives

National Motor Vehicle Fatality Trends

Teen and Senior Drivers

Cooperative Agreement Between DMV and NHTSA

Winter 1994/95

DUI Incidents Continue to Decline

DMV Study Confirms: Drivers Assigned to TVS Represent Increased Accident Risks

Hard Core DUI Offenders

Drug Arrests and Driving Risk

New Drive Test

Winter 1995/96

Final Report Documents NOTS Benefits

How Reliable is California's CDL Drive Test?

Accident Costs and Benefit Cost Analysis

Do Traffic Violator Schools Improve Knowledge, Attitudes, and Driving Performance?

Crashes Predicted when Compensation for Visual Impairment is Inadequate

Traffic Accident Risk Factors

Summer 1997

Unlicensed Driving: A Major California Safety Problem

The California Ignition Interlock Force

Predicting DUI Recidivism

Traffic Violator School Dismissals Stabilize

Evaluation of Licensing Programs for Functionally-Impaired Drivers

California's 0.08% BAC Limit and Administrative License Suspension Laws Working to Deter
Drunk Driving Accidents

DUI Fatalities Cut in Half

Dementia/Frailty Study—Where Are We Now?

Final Study of Driving Performance Evaluation Test – A Progress Report

Older Drivers: License Restriction vs. Revocation

Spring 1998

Vehicle Impoundment Law Found Effective

DUI Injuries and Fatalities Continue to Decline

California Written Test Evaluation Demonstrates High Failure Rates

National Strategic Highway Safety Plans for the Year 2000
Revised Teen & Senior Facts Report Confirms Previous Trends
Dementia/Frailty Study Identifies Improved Assessment Techniques

Fall 1999

The Internet, DUI Probation and the Courts
Child Pedestrian Collisions Related to Driver History Factors
3-Tier Assessment System
Evaluation of the Efficacy of Ignition Interlock in California
Class C Written Test Evaluation II
Driver Performance Evaluation Road Test

2003

Serving Our Seniors
Medical Conditions and Other Factors in Driver Risk
Class C Written Knowledge Test Evaluation
The Contribution of Driving Exposure in the Prediction of Traffic Accidents
An Evaluation of the Implementation of Ignition Interlock in California
DUI in California: Recommendations for the Legislative Reform
Is Hone-Study Driver Education a Viable Alternative to the Traditional 30-hour Classroom Course

IMPLEMENTATION STATUS OF FINDINGS AND RECOMMENDATIONS:

Not applicable.

SUPPLEMENTARY INFORMATION:

None.